

Amendments to the Drawings:

The attached sheets of drawings include changes to FIGS. 1 and 8. These sheets, which include FIGS. 1 and 8 replace the original sheets including FIGS. 1 and 8, respectively.

Attachment: Replacement Sheets

REMARKS/ARGUMENTS

Record of Interview (Substance of Interview):

A telephone interview was conducted on March 1, 2007 between Examiner Maureen G. Arancibia and Sue Funchess, the secretary to Michael Lee (Reg. No. 31,846). In the interview, the Examiner confirmed that the Office Action mailed February 23, 2007 was a Non-Final Office Action, and that the incorrect box was inadvertently checked on the Office Action Summary page.

Claim Status and Amendment to the Claims:

Claims 2, 3, 5-14 and 18-26 are pending in this application.

Claims 11-14 have been withdrawn.

Claims 2, 3, 5-14 and 18-23 stand rejected.

Claims 3, 5, and 7-8 have been amended for further prosecution. The amendment also includes minor changes of a clerical nature.

New claims 24-26 have been added, which particularly point out and distinctly claim the subject matter of the invention. The new claims are supported by the description on page 12, line 17 through page 13, line 5 of the present specification and FIGS. 5 and 6.

No new matter has been introduced by this amendment.

Amendment to the Drawings:

FIGS. 1 and 8 have been amended to correct minor informalities. In FIG. 1, numeral reference 800 has been changed to 100 in accordance with the description on page 3, line 25-26 of the specification. In FIG. 8, numeral reference 100 has been changed to 800 in accordance with the description on page 15, line 1 of the specification. No new matter has been introduced by this amendment.

Rejection of Claims under 35 U.S.C. § 112:

Claims 5-8 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 5 and 7-8 have been amended to change “confinement rings” to -- at least one confinement ring-- in accordance with the Examiner’s suggestion so as to provide proper antecedent basis. With this amendment, it is respectfully requested that the 35 U.S.C. § 112, second paragraph rejections be withdrawn.

Rejection of Claims under 35 U.S.C. § 103:

Claims 2, 3, 5-10, and 18-23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 6,074,518 to Imafuku et al. in view of U.S. Patent 6,019,060 to Lenz. Applicants respectfully disagree for the reasons set forth below.

To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Claim 2 recites, among others, that a magnetic field magnetically enhancing physical confinement provided by the at least one confinement ring, wherein magnetic field lines passing from the first magnetic element to the second magnetic element pass through the at least one confinement ring.

Imafuku shows magnets 72 and 74 to form an annular local magnetic field between the circumferential edge portion of the upper electrode 21 and circumferential portion of the susceptor 5 (column 12, lines 40-44 thereof). The purpose of Imafuku’s magnets is to trap charged particles and enclose plasma in the plasma generation region (column 12, lines 43-47 thereof). That is, Imafuku’s magnetic field is provided for plasma confinement. However, as the Examiner correctly noted, Imafuku fails to teach or suggest confinement rings.

Lenz shows a cam-based arrangement for positioning confinement rings 102 (or 316 and 320). The Examiner alleges that it would have been obvious to modify Inahuku's apparatus to incorporate Lenz's confinement rings in order to "allow local control of the pressure at the substrate surface during plasma processing, and thereby, among others, to improve response time." However, it is Lenz's cam-based arrangement that changes the position of the confinement rings relative to one another so as to facilitate local control of the pressure (see column 7, lines 64-67 thereof), not the confinement themselves. The primary purpose of the confinement rings is physical plasma confinement.

Thus, Imafuku's magnets provide plasma enclosure or confinement, and Lenz's confinement rings also provide plasma confinement. Lenz's cam-based arrangement additionally provide pressure control to improve response time as the Examiner alleges. Accordingly, there is no reason and/or motivation to combine Imafuku and Lenz, because either the magnetic fields of Imafuku or the confinement rings of Lenz would provide sufficient plasma confinement by themselves and do not require the other. Thus combining the two systems would be redundant and unnecessarily increase the cost and complexity of the device. Accordingly, the claimed invention would not be obvious from the alleged combination of Imafuku and Lenz.

Furthermore, even if Imafuku and Lenz should be combined in order to achieve the alleged benefits, Lenz's confinement rings can be placed any radial location surrounding the plasma region: (a) closer to the plasma region than the magnets; (b) at the same or substantially the same location as the magnets; or (c) farther from the plasma region than the magnets, in Imafuku's plasma processing apparatus. However, in order for the magnetic field lines to pass through the confinement ring(s), as recited in claims 2, the location of the magnets and that of the confinement ring must be aligned or arranged in a specific way, for example, as shown in FIGS. 1-3 and 6 of the present application. Thus, in the alleged combination achieving the alleged benefits, the magnetic fields may or may not intersect Lenz's confinement rings. Accordingly, although the claimed arrangement may occur from the alleged combination under certain circumstances, such a specific arrangement is mere possibility. The feature missing from the prior art, i.e., the magnetic field's passing through the confinement rings, is not necessarily present in the alleged combination of Imafuku and Lenz.

The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) (reversed rejection because inherency was based on what would result due to optimization of conditions, not what was necessarily present in the prior art); *In re Oelrich*, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.'" *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999).

Furthermore, Imafuku's magnetic fields are solely for plasma confinement, and thus Imafuku fails to teach or suggest magnetically enhancing physical confinement provided by the magnetic ring(s) as recited in claim 1. The cooperative or interactive arrangement of the magnetic field and confinement ring(s) so as to enhance the physical confinement is Applicant's own idea. Such idea is neither suggested by nor necessary present in any of the cited references. The purpose of the claimed magnetic field is to bend trajectories of charged particles by the magnetic field and/or increase the path length of charged particles as described in page 6 of the present specification, contrary to Imafuku's magnetic fields aimed at plasma confinement. Without those specific purposes, the alleged combination of Imafuku and Lentz would not yield the claimed specific arrangement the magnetic field and the confinement ring(s). In accordance with the claimed magnetic enhancement, the charged particles are directed into the confinement rings and/or cause to collide into the confinement ring(s). (This feature is specifically recited in dependent claim 3.)

Accordingly, the alleged combination of Iafuku and Lenz still fails to teach or suggest, not only explicitly but also inherently, the claimed specific interactive arrangement of the magnetic field and the confinement ring(s), in which the magnetic field magnetically enhances physical confinement provided by the confinement ring(s) where the magnetic field lines pass through the confinement ring(s), as recited in claim 2.

Therefore, it is respectfully requested that the rejection based on Imafuku and Lenz be withdrawn.

Regarding Dependent Claims:

If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Claims 3, 5-10 and 18-26 directly or indirectly depend from claim 2 and thus include all of the limitations of claim 2. Accordingly, these dependent claims are also patentable at least for the same reasons discussed above.

Nevertheless, Applicants respectfully assert that the dependent claims further recite additional patentable features as set forth below.

The Examiner alleges that claim 3 recites intended use or function of the apparatus. However, claim 3, as amended, clearly recites the configuration (i.e., structural limitation) of the magnetic source. It should be noted that the magnetic fields of the claimed invention do not provide plasma confinement by itself (see page 16, lines 16-17 of the present specification), contrary to Imafuku's apparatus as discussed above, but enhance physical confinement by the confinement ring(s) by increasing collisions of charged particles with the confinement ring(s). None of the cited references teach or suggest increasing such collisions of charged particles with the confinement rings. Accordingly, claim 3 provides additional ground for patentability of the claimed invention.

With respect to claim 5, Examiner alleges that, although the alleged combination does not teach a specific dimensional relationship between the magnetic elements and the confinement rings, "the inner and outer diameter of the confinement rings is not believed to cause difference in performance of the apparatus, since narrower or wider confinement rings would still be just as capable of closing and opening the variable gap." However, as discussed above, the claimed invention is not obtained by the alleged combination of Imafuku and Lenz, but requires a specific interactive arrangement of the magnets and the confinement rings which is missing from the alleged combination. While in the alleged Imafuku-Lenz combination the magnetic fields confine the plasma and the confinement rings control the local pressure as the Examiner alleges, in the claimed invention, the confinement ring(s) and the magnetic field passing therethrough cooperatively provide effective confinement of plasma by increasing collision of charged

particles onto the confinement ring(s). Claim 5 recites specific configuration achieving such a cooperative arrangement, namely, the first and second magnetic elements are located between the inner and outer diameters of the confinement ring(s), as shown in FIG. 2 of the present application.

Claims 6, 19 and 22 (and new claims 24-26) recite another specific configuration achieving such a cooperative arrangement: the magnetic field lines' intersecting the confinement ring(s) at an angle between being perpendicular to 45°, or in a canted manner, which is illustrated in, for example, FIGS. 6 and 7 of the present application.

Accordingly, those dependent claims, among others, further provide patentable features of the present invention.

Conclusion:

Applicants believe that all pending claims are allowable and respectfully request a Notice of Allowance for this application from the Examiner.

Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,

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